General

Guideline Title

Secondary prevention of ischemic heart disease and stroke in adults.

Bibliographic Source(s)

University of Michigan Health System. Secondary prevention of ischemic heart disease and stroke in adults. Ann Arbor (MI): University of Michigan Health System; 2014 May. 23 p. [83 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: University of Michigan Health System. Secondary prevention of coronary artery disease. Ann Arbor (MI): University of Michigan Health System; 2009 Mar. 11 p. [36 references]

Recommendations

Major Recommendations

Note from the University of Michigan Health System (UMHS) and the National Guideline Clearinghouse (NGC): The following guidance was current as of May 2014. Because UMHS occasionally releases minor revisions to its guidance based on new information, users may wish to consult the original guideline document for the most current version.

Note from NGC: The following key points summarize the content of the guideline. Refer to the original guideline document for additional information.

The levels of evidence (A–D) and strength of recommendation (I–III) are defined at the end of the "Major Recommendations" field.

Secondary prevention. Patients with ischemic heart disease (IHD) or stroke should receive intensive secondary prevention interventions, which offer large absolute risk reductions for subsequent events and mortality *[IA]*. Table 1 below summarizes secondary prevention recommendations for the main and modifiable risk factors listed below for patients with coronary and other vascular disease. Less common risk factors for ischemic vascular disease (IVD) are not addressed in this guideline.

Lifestyle with Medication

- Blood pressure control
- Tobacco treatment
- Lipid management
- Diabetes management

- Depression screening

Medication

- Antiplatelet agents and anticoagulants
- β blockers in IHD
- Renin-angiotensin-aldosterone system blockers in IHD
- Pain control (non-steroidal anti-inflammatory drugs [NSAID] caution)
- Immunizations

Lifestyle

- Physical activity
- Weight management
- Nutrition
- Supplements

Surgery

Carotid endarterectomy or stenting for symptomatic lesions

Table 1. Recommendations for Secondary Prevention of IVD

	Lifestyle with Medication

Blood Pressure Control	Blood pressure (BP) goal:
	• If no relevant comorbidities: <140/90 mm Hg in patients with ischemic heart disease (IHD) *[IA]*.
	• Lowering BP in a stroke patient is recommended *[IA]*, although acutely lowering blood pressure after stroke is not recommended.
	• In patients with lacunar stroke, a systolic blood pressure (SBP) of less than 130 should be targeted *[IA]*. In patients with other types of stroke the target blood pressure is not clear, but experts generally recommended a SBP of less than 140.
	• If diabetes mellitus: SBP <140 *[IA]*, diastolic blood pressure (DBP) <90, with some evidence for <80.
	• If chronic kidney disease (CKD) with urine albumin excretion >30mg/24 hours, suggest <130/80 *[IIA]*.
	
	For patients not at target:
	• Initiate lifestyle modifications: weight control, appropriate physical activity, alcohol moderation, sodium reduction, and healthy diet *[IA]*. If further BP lowering needed:
	• Add medications based on patient characteristics and as tolerated. For patients with:
	  ◦ IHD – treat initially with β blockers and/or angiotensin-converting enzyme (ACE) inhibitors (or angiotensin receptors blockers [ARBs] in case of ACE intolerance), with addition of other BP drugs such as thiazide diuretics or calcium blockers as needed to achieve goal blood pressure *[IA]*.
	  ◦ Stroke – β blockers are NOT recommended unless another indication for β blockade exists, as they seem to lower blood pressure without decreasing stroke risk *[IIIA]*.

Tobacco Treatment	Goal: Complete cessation. Ask all patients about tobacco use. Tobacco use status should be documented in the medical record and re-assessed at every patient encounter *[IA]*. Advise all tobacco users seriously to consider making a quit attempt using a clear and personalized message [IA]. Advice as brief as three minutes is effective *[IA]*. Assess all tobacco users' willingness to make a quit attempt. If not ready to quit, offer motivational intervention using the 5 "R's" – relevance, risks, rewards, roadblocks, repetition *[IA]*. Assist those ready to make a quit attempt. Refer patients interested in quitting within 30 days to a Tobacco Treatment specialist or other appropriate tobacco treatment program *[IA]*. Alternatively healthcare providers can directly provide the following treatment: • Set a quit date. Quit date adherence is a strong predictor of long-term success. • Give advice on quitting and provide supplementary materials. • Prescribe pharmacologic therapy as appropriate. Nicotine replacement therapies, bupropion hydrochloride, and

	varenicline have been proven effective. Arrange follow-up either with phone call or office visit *[IA]*. Subsequent visits: • Prevent relapse by congratulating successes and reinforcing reasons for quitting. • Assess any difficulties with pharmacologic therapy.
Lipid Management	Full lipid panel (total cholesterol, low-density lipoprotein cholesterol [LDL-C], high-density lipoprotein cholesterol [HDL-C], and triglycerides): Obtain for all patients *[IA]*. Lifestyle modification: recommend regular exercise if no contraindication, assess and strongly recommend lowering caloric intake from saturated fat to <7%, and recommend lowering the percentage of calories from trans fats *[IA]*. Secondary causes of lipid disorders: assess for and optimize if identified. Statin (if no contraindication): • If ≤75 years old with ischemic vascular disease (IVD), recommend high-intensity statin therapy (atorvastatin 40 mg to 80 mg, rosuvastatin 20 mg to 40 mg) in order to lower LDL-C by 50% or greater of baseline *[IA]*. • If >75 years old with IVD, recommend moderate-intensity statin therapy (see text in the original guideline document) *[IC]*. Other/additional medications: Consider in patients who are completely statin intolerant or are not able to tolerate the recommended statin intensity.

Diabetes Management	Glycemic control:
	
	• Type 1 diabetes: Tight glycemic control (hemoglobin A1c [HbA1c] <7%) *[IA]*
	• Type 2 diabetes:
	  • Glycemic control prevents microvascular complication, but benefit has not been proven for secondary prevention of macrovascular complications.
	  • The American Diabetes Association in general recommends an A1c goal of <7% *[IIB]*; however a less stringent goal of <8% is reasonable in patients with advanced macrovascular complications or high risk for hypoglycemia *[IIB]*.
	
	Blood pressure goal: SBP ≤140 mm Hg *[IB]*. DBP <90 per Joint National Committee (JNC) 8 Panel, possibly better if <80 per American Diabetes Association.
	
	Statin therapy: at least use moderate-intensity statin therapy if no contraindication. (See "Statin" in Lipid Management section above for further details.)
	
	Tobacco use: Check status at every encounter and at minimum annually. Recommend nonsmoking, educate, encourage cessation *[IC]*.

Depression Screening	Screen for depression: is reasonable in patients with IVD. Treat depression or refer when indicated *[IIB]*. Initial screening for patients with IHD can be performed by use of the standard Patient Health Questionnaire-2 (PHQ-2) depression screening tool: During the past month, have you been bothered by: • Little interest or pleasure in doing things? • Feeling down, depressed or hopeless? If the patient responds "yes" to either question, move to the more detailed PHQ-9.
Medication	
Antiplatelet Agents and Anticoagulants	For established IHD: antiplatelet. Prescribe aspirin at a dose of 81 mg daily [IA]. In patients intolerant to aspirin, prescribe clopidogrel at a dose of 75 mg daily (or ticlopidine after consulting with cardiology) indefinitely *[IA]*. For recent acute coronary syndromes treated medically without angioplasty: antiplatelet. In addition to aspirin, add clopidogrel at a dose of 75 mg daily for at least 1 month *[IA]* and ideally up to 1 year post-event. Following coronary stent placement: antiplatelet. Prescribe aspirin at a dose of 81 mg as above *[IA]*. The duration of therapy of additional antiplatelet is usually determined by the cardiologist.

	If stent for acute coronary syndrome: Whether bare-metal stent (BMS) or drug eluting stent (DES), prescribe a P2Y12 inhibitor for at least 12 months. Options include clopidogrel 75 mg daily, prasugrel 10 mg daily, or ticagrelor 90 mg bid (twice a day) *[IA]*. Specific instructions and cautions regarding each P2Y12 are included in the text in the original guideline document.
	
	If stent for non-acute coronary syndrome:
	
	• If a DES, prescribe clopidogrel 75 mg daily for 12 months *[IA]*.
	• If a BMS, prescribe clopidogrel 75 mg daily for a minimum of 1 month and ideally up to 12 months. In patients at increased risk for bleeding, consider 2 weeks of therapy *[IA]*.
	
	Following non-cardioembolic stroke:
	
	• Antiplatelets are recommended over anticoagulation because of similar benefit and less bleeding risk. Acceptable options for secondary prevention of non-cardioembolic stroke are: aspirin 50 mg to 325 mg daily, aspirin 25 mg plus extended-release dipyridamole 200mg twice daily, and clopidogrel 75 mg daily *[IA]*. Individual patient factors should guide the choice of agent.
	• Not recommended: combination of aspirin and clopidogrel for long term prevention of stroke. In general, this combination increases the risk of hemorrhage compared to a single antiplatelet agent *[IIIA]*.
	• If already on an antiplatelet agent (when a stroke occurs): No evidence exists for the effectiveness of changing the dose or switching to a different antiplatelet agent *[IIID]*.
	• Patients who undergo carotid stenting should be on dual antiplatelet therapy before, and for a minimum of 30 days after the procedure *[IB]*. Duration should be determined by the interventionist.
	
	In patients with persistent or paroxysmal non-valvular atrial fibrillation: an anticoagulant is generally recommended over an antiplatelet.
	
	• Anticoagulants: Warfarin (target international normalized ratio [INR] 2-3) *[IA]*, dabigatran *[IA]*, rivaroxaban *[IIA]*, and apixaban *[IA]* are indicated to prevent recurrent stroke. For patients unsuitable for anticoagulation, aspirin 325 mg, although less effective, is the preferred antiplatelet alternative *[IIB]*. Apixaban is more effective alternative to aspirin in patients who are unsuitable for warfarin without significantly increasing the bleeding risk.
	  • If severe renal failure: do NOT use dabigatran, rivaroxaban, or apixaban (creatinine clearance [CrCl] <15 mL/min for dabigatran and rivaroxaban, CrCl <25 mL/min for apixaban) *[IIID]*.
	  • If impaired renal function: exercise caution and adjust doses when using apixaban, dabigatran, or rivaroxaban *[ID]*.
	• When considering or using dabigatran, rivaroxaban, or apixaban:
	  • Consider checking renal function every six months as the anticoagulant effects of these agents can be potentiated by worsening renal function *[IID]*.
	  • Use care in prescribing these agents because of the potential for adverse events because clinicians have less experience with them than warfarin or aspirin *[IID]*.
	  • Be aware that there are no U.S. Food and Drug Administration (FDA) approved reversal agents currently available
	• Management of an antiplatelet agent for patients with a concomitant indication for anticoagulation. In patients with stroke or stable IHD (without acute coronary syndrome [ACS], percutaneous coronary intervention [PCI], or coronary artery bypass grafting [CABG] in the past year) who require anticoagulation with warfarin, there is no need for an additional antiplatelet agent *[IIA]*. The efficacy of stopping an antiplatelet agent in a patient on a new oral anticoagulant is unclear.
	• Consider adding a proton pump inhibitor (PPI) to lower the risk of gastrointestinal (GI) bleeding in patients taking an anticoagulant or antiplatelet. See text in the original guideline document for details.

β blockers in IHD	Beneficial: Start and continue oral β blocker therapy indefinitely (unless contraindicated) in all patients who either have had a ST-elevated myocardial infarction (STEMI) *[IA]* or have unstable angina (UA)/non-ST-elevated myocardial infarction (NSTEMI) with left ventricular (LV) dysfunction *[IB]*. Reasonable: Prescribe β blockers for low-risk patients (i.e., normal LV function, revascularized, no high-risk features) recovering from UA/NSTEMI in the absence of absolute contraindications *[IIB]*.
Renin-angiotensin-aldosterone System Blockers in IHD	ACE inhibitors: prescribe unless contraindicated in all patients with IHD who also have hypertension, diabetes mellitus, LV ejection fraction 40% or less, or chronic kidney disease. *[IA]*. An ACE inhibitor is an appropriate choice for other patients with IHD *[IIB]*. ARBs: prescribe to the above patients if they are intolerant of ACE inhibitors *[IA]*. Aldosterone blockade: prescribe for patients who are post-myocardial infarction and are: • Receiving maximum therapeutic doses of an ACE inhibitor (or ARB) and β blocker

	• Have a left ventricular ejection fraction <40% • Have either diabetes or symptomatic heart failure • Have estimated CrCl >30 ml/min and do not have hyperkalemia (potassium is <5.0 mEq/L)
Non-steroidal Anti-inflammatory Drug (NSAID) for Pain Control	At admission for acute coronary syndrome: discontinue all cyclooxygenase-2 (COX-2) inhibitors and NSAIDs, EXCEPT aspirin as above *[ID]*. NSAIDs increase IHD events and alternative should be sought. In patients with IHD requiring analgesia: a stepped-care approach to treatment should be used *[ID]* (see text in the original guideline document). If the initial stepped approach is insufficient, using nonselective NSAIDs (preferably naproxen) is reasonable *[IID]*.
Immunizations	Influenza vaccination: annually (inactivated, injectable) *[IB]*. Pneumococcal vaccination (polysaccharide vaccine): initially when diagnosed with IVD and if initial vaccination occurred before age 65 years, revaccination after age 65 and 5 years have passed since initial vaccination *[IB]*.
Lifestyle	
Physical Activity	Assess risk associated with exercise (e.g., need for cardiopulmonary monitoring) using a physical activity history and/or exercise test to guide the exercise recommendation *[IB]*. Encourage: • Moderate intensity aerobic activity for at least 30 minutes daily, at least 5 days per week, supplemented by an increase in daily lifestyle activities *[IIB]*. • Resistance training 2 days per week *[IID]*. For those with recent acute coronary syndromes or recent revascularization: Recommend medically supervised cardiac rehabilitation programs *[IA]*.
Weight Management	Each visit: Assess body mass index (BMI) and encourage weight maintenance/reduction through an appropriate balance of physical activity, nutrition/caloric intake, and formal behavioral programs when indicated to achieve and maintain a body mass index between 18.5 and 24.9 kg/m^2 *[IC]*. For patients >65 years, a BMI of <22 kg/m^2 may be below normal and a BMI of 25 kg/m^2 to 30 kg/m^2 may be acceptable *[IID]*. Initiate treatment for non-elderly patient: If overweight (BMI 25.00 to 29.99) or obese (BMI ≥30.00), initiate lifestyle change through diet and exercise *[IC]*. Weight loss goals: Initial goal of weight loss strategy should be to reduce body weight 5% to 10% from baseline over a span of 6 months. With success further weight loss can be attempted if indicated through further assessment *[ID]*.

Nutrition	Promote:
	
	• Consuming a variety of nutritious foods:
	  • Fruits, vegetables, legumes, nuts, soy products, low-fat dairy products, whole grain breads, and lean meat.
	  • Baked or broiled fish at least twice per week.
	  • Oils and margarines low in saturated fats and trans fat and high in omega-3 fat, such as canola, soybean, walnut, and flaxseed oils including those fortified with stanols and sterols. Monosaturated fats like olive oil are preferred over saturated fats.
	  • Less than 2 grams of sodium per day, especially if there is comorbid hypertension.
	• Avoiding:
	  • High calorie foods including sugar, sugar-sweetened beverages, and candy.
	  • Foods high in saturated and trans fats, such as red meat, whole milk products, and pastries (saturated fats <7% daily calories, trans fatty acids <1% daily calories, cholesterol <200 mg per day).
	• Limiting:
	  • Eating out and fast food
	  • Alcohol to no more than 2 drinks per day (men) or 1 drink per day (women). Complete abstinence if alcohol contraindicated or history of alcohol abuse.
	• Addressing environmental and family factors associated with eating, including creating a healthful eating environment that is responsive to hunger and fullness cues.

Surgery	
Symptomatic Carotid Artery Disease	Carotid endarterectomy: • Recommended for patients with a non-disabling stroke or transient ischemic attack (TIA) within 6 months and 70%

	to 99% ipsilateral stenosis when the perioperative rate of major adverse events is <6% *[IA]*. • Consider for patients with a non-disabling stroke or TIA within 6 months and 50% to 69% ipsilateral stenosis, based on individual patient factors when the perioperative rate of major adverse events is less than 6% *[IIA]*. • Perform carotid endarterectomy as early as judged possible after the stroke or TIA, when risk of another stroke is highest. This benefit of surgery decrease with time *[IIB]*. Carotid stenting: An alternative to carotid endarterectomy when patients at high risk for surgery or in specific circumstances (e.g., high carotid bifurcation, extensive radiation induced stenosis, prior carotid intervention). The perioperative morbidity and mortality of carotid stenting should be less than 6% *[IIA]*. Other therapies: All patients with carotid disease after stroke should be on optimal medical therapy and have appropriate lifestyle modifications, whether or not an intervention is performed *[IA]*.

Table 2. Supplements: Benefit in Reducing Cardiovascular Risk

Probably beneficial:

- Omega-3 supplements 1 to 2 g per day if insufficient intake from fish *[IIC]*

Possibly beneficial:

- Stanol/sterol ester margarines (2 g per day) *[IID]*
- Soluble fiber such as oat bran, psyllium, guar, and pectin (5 to 20 g per day) *[IID]*
- Soy foods and soy protein (equivalent to 25 g of soy protein daily) *[IID]*
- Tea containing flavonoids, e.g., black tea, green tea, and some herbal tea (1 to 2 cups) *[IID]*
- Magnesium to recommended dietary intake (men 420 mg, women 320 mg) *[IID]*

Not recommended:

- Vitamin C, vitamin E, and beta-carotene supplementation in patients with stable ischemic heart disease (IHD) *[IIIA]*
- Treatment of elevated homocysteine with folate or vitamins B6 and B12 in patients with stable IHD *[IIIA]*
- Garlic, coenzyme Q10, selenium and chromium *[IIID]*
- Chelating therapy *[IIID]*

Not recommended and possibly harmful:

- Estrogen therapy in post-menopausal women with stable IHD and or history of transient ischemic attack (TIA) or stroke *[IIIA]*
- Testosterone in men with ischemic vascular disease (IVD) *[IIIB]*
- Levels exceeding the upper tolerable limits for vitamins C (2,000 mg/day) and E (1,000 mg/day); and beta-carotene
- Ephedra, oleander, or other herbal/botanicals with well-defined contraindications to cardiovascular drug and or cardiovascular disease (CVD) conditions

Definitions

Levels of Evidence

A. Randomized controlled trials
B. Controlled trials, no randomization
C. Observational trials
D. Opinion of expert panel

Strength of Recommendation

I. Generally should be performed
II. May be reasonable to perform
III. Generally should not be performed

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Ischemic vascular disease (IVD), including:

- Ischemic heart disease (IHD) – both angina (stable or unstable) and myocardial infarction (ST segment elevation [STEMI] and non-ST segment elevation [NSTEMI])
- Ischemic stroke and transient ischemic attack (TIA)

Note: Other types of IVD (e.g., peripheral vascular disease, ischemic bowel disease) are not addressed.

Guideline Category

Prevention

Clinical Specialty

Cardiology

Family Practice

Internal Medicine

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

To improve secondary prevention of ischemic vascular disease (IVD) by assembling in one location core recommendations for the actions that should be taken or considered

Target Population

Adults with ischemic vascular disease (IVD), including:

- Ischemic heart disease (IHD) – both angina (stable or unstable) and myocardial infarction (ST segment elevation [STEMI] and non-ST segment elevation [NSTEMI])
- Ischemic stroke and transient ischemic attack (TIA)

Interventions and Practices Considered

1. Lifestyle with medication
    - Blood pressure control

    - Tobacco treatment
    - Lipid management
    - Diabetes management
    - Depression screening
2. Medication
    - Antiplatelet agents and anticoagulants
    - β blockers
    - Renin-angiotensin-aldosterone system blockers
    - Pain control (non-steroidal anti-inflammatory drugs [NSAID] with caution)
    - Immunizations
3. Lifestyle modifications
    - Physical activity
    - Weight management
    - Nutrition
    - Supplements
4. Surgery
    - Carotid endarterectomy
    - Stenting for symptomatic lesions

Major Outcomes Considered

- Subsequent cardiovascular events
- Mortality
- Medication compliance
- Adherence to lifestyle modification
- Improved lab results

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Secondary Sources)

Description of Methods Used to Collect/Select the Evidence

The overview of secondary prevention recommendations was assembled from existing guidelines. The University of Michigan Health System (UMHS) has already developed guidelines addressing many of the components of secondary prevention (i.e., tobacco cessation, hypertension, lipid management, diabetes mellitus, obesity [physical activity, weight management, nutrition], and immunizations). The review began with the UMHS guidelines and the national guidelines referenced in them. The review expanded to other relevant guidelines of the American College of Cardiology (ACC), the American Heart Association (AHA), and the American Stroke Association (ASA). Then evidence from relevant guidelines referenced in those guidelines and other relevant national guidelines known to the authors were added. The search focused on guidelines published from January 2000 through July 2008 to produce the 2009 version of this guideline. This 2014 update included similar searches for evidence in more current guidelines over the period from August 2008 through December 2013. The section of this guideline on "Related National Guidelines" lists twenty current national guidelines on which this overview is based.

The search was supplemented with very recent clinical trials known to expert members of the panel. Negative trials were specifically sought.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence

A. Randomized controlled trials
B. Controlled trials, no randomization
C. Observational trials
D. Opinion of expert panel

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Conclusions were based on prospective randomized controlled trials (RCTs) if available, to the exclusion of other data; if RCTs were not available, observational studies were admitted to consideration. If no such data were available for a given link in the problem formulation, expert opinion was used to estimate effect size.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendation

I. Generally should be performed
II. May be reasonable to perform
III. Generally should not be performed

Cost Analysis

Adding a proton pump inhibitor (PPI) to antiplatelet therapy is cost effective for individuals at increased risk for gastrointestinal (GI) bleeding, but is not cost effective in patients with average bleeding risk.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Drafts of this guideline were reviewed in clinical conferences and by distribution for comment within departments and divisions of the University of Michigan Medical School to which the content is most relevant: Cardiovascular Medicine, Family Medicine, General Internal Medicine, Neurology and the Committee of Pharmacy and Therapeutics. The final version was endorsed by the Clinical Practice Committee of the University of Michigan Faculty Group Practice and the Executive Committee for Clinical Affairs of the University of Michigan Hospitals and Health Centers.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is specifically stated select recommendations (see the "Major Recommendations" field).

Conclusions were based on prospective randomized controlled trials (RCTs) if available, to the exclusion of other data; if RCTs were not available, observational studies were admitted to consideration. If no such data were available for a given link in the problem formulation, expert opinion was used to estimate effect size.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Reduced risk of subsequent cardiac events and mortality
Prevention of coronary artery disease and other vascular disease

Potential Harms

- The U.S. Food and Drug Administration (FDA) issued an alert regarding serious neuropsychiatric symptoms occurring in patients taking varenicline; however, it still continues to be considered first line therapy. Clinicians should elicit information on their patients' psychiatric history and monitor them for changes in mood or behavior on therapy.
- Antiplatelet and anticoagulant therapy
    - Prasugrel is not recommended in patients older than 75 years of age except in those patients with diabetes or prior history of myocardial infarction (MI). Prasugrel has not been studied in patients undergoing elective percutaneous coronary intervention (PCI).
    - Ticagrelor is associated with higher rates of transient dyspnea and bradycardia. Ticagrelor has not been studied in elective PCI.
    - The combination of aspirin and clopidogrel increases the risk of bleeding without reducing the risk of stroke, therefore, the long-term use of dual antiplatelet therapy cannot be recommended for non-cardioembolic stroke.
    - Anticoagulation with warfarin or one of the three new anticoagulants increases the risk of bleeding without reducing the risk of ischemic events in patients with stroke due to cardioemboli.
    - Antiplatelet therapy reduces risk of cardiovascular events, but increases risk for gastrointestinal (GI) tract bleeding.
    - There are limited data on the safety of "triple therapy" with aspirin, clopidogrel, and warfarin, leading to significant concerns about the risk of bleeding.
- In the acute setting, the routine use of intravenous (IV) β blockers for all patients is not recommended, as it may be harmful to administer them to those with contraindications to beta blockade, signs of heart failure or low output state, or other risk factors for cardiogenic shock.
- Serum potassium should be monitored closely during treatment with aldosterone blockade. Although uncommon, life-threatening hyperkalemia can occur due to the combination of aldosterone inhibition, reduced aldosterone secretion associated with angiotensin-converting enzyme (ACE) inhibitor therapy, and a progressive decline in renal perfusion due to heart failure.
- The selective cyclooxygenase-2 (COX-2) inhibitors and other nonselective non-steroidal anti-inflammatory drugs (NSAIDs) have been associated with increased cardiovascular risk. The risk of cardiovascular events is proportional to COX-2 selectivity.
- Of note, some herbal remedies can have cardiotoxic properties, some may lower serum potassium, and some may interact with cardiovascular drugs.
- Patient selection for carotid revascularization is important as perioperative risks can negate potential benefits from the procedure.

Contraindications

Contraindications

- Nicotine transdermal formulations are contraindicated in patients with arrhythmias, worsening angina, severe angina, and within 2 weeks of myocardial infarction. Use nicotine supplements with caution in patients with ischemic heart disease (IHD).
- Prasugrel is contraindicated in patients with a prior history of stroke or transient ischemic attack (TIA).
- The new oral anticoagulants are contraindicated for patients with renal failure and caution should be used in patients with renal impairment.
- Influenza vaccine is contraindicated in patients with severe egg allergy or previous allergy/anaphylaxis to influenza vaccine and cautioned with previous Guillain-Barré syndrome.
- Ephedra, oleander, or other herbal/botanicals have well-defined contraindications to cardiovascular drug and or cardiovascular disease (CVD) conditions.
- Anticoagulation with any agent is not recommended immediately after an acute stroke due to the risk of hemorrhagic transformation.
- With the exception of aspirin, all non-steroidal anti-inflammatory drugs (NSAIDS) and cyclooxygenase-2 (COX-2) inhibitors should be discontinued immediately at the time of an acute coronary syndrome presentation.
- Bile acid sequestrants (resins) are relatively contraindicated in patients with triglycerides ≥200 mg/dL.
- Contraindications to β blockers include signs of acute heart failure, evidence of a low output state and increased risk for cardiogenic shock.

Qualifying Statements

Qualifying Statements

These guidelines should not be construed as including all proper methods of care or excluding other acceptable methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific clinical procedure or treatment must be made by the physician in light of the circumstances presented by the patient.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Patient Resources

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

University of Michigan Health System. Secondary prevention of ischemic heart disease and stroke in adults. Ann Arbor (MI): University of Michigan Health System; 2014 May. 23 p. [83 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2009 Mar (revised 2014 May)

Guideline Developer(s)

University of Michigan Health System - Academic Institution

Source(s) of Funding

University of Michigan Health System

Guideline Committee

Secondary Prevention of Ischemic Heart Disease and Stroke Guideline Team

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Financial Disclosures/Conflicts of Interest

The University of Michigan Health System endorses the Guidelines of the Association of American Medical Colleges and the Standards of the Accreditation Council for Continuing Medical Education that the individuals who present educational activities disclose significant relationships with commercial companies whose products or services are discussed. Disclosure of a relationship is not intended to suggest bias in the information presented, but is made to provide readers with information that might be of potential importance to their evaluation of the information.

Team Member	Relationship	Company

Team Member	Relationship	Company
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Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: University of Michigan Health System. Secondary prevention of coronary artery disease. Ann Arbor (MI): University of Michigan Health System; 2009 Mar. 11 p. [36 references]

Guideline Availability

Electronic copies: Available from the University of Michigan Health System Web site .

Availability of Companion Documents

Continuing Medical Education (CME) information is available from the University of Michigan Health System Web site .

Patient Resources

The following are available:

- What is ischemic vascular disease? Ann Arbor (MI): University of Michigan Health System; 2014 May. 4 p. Electronic copies: Available from the University of Michigan Health System Web site (UMHS) .
- What you need to know about ischemic vascular disease. Ann Arbor (MI): University of Michigan Health System; 2014 May. 22 p. Electronic copies: Available from the UMHS Web site .
- My I-Smart: action plan for chronic conditions. Ann Arbor (MI): University of Michigan Health System; 2014. 2 p. Electronic copies: Available from the UMHS Web site .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

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